Brooke Frischemeier, Senior Director of Product Management, Robin.io ●●●

Shaping a cloud-native future for 5G, with the use of Kubernetes ●●

According to UK-based market research firm, Precision Report, the global Container and Kubernetes market is expected to reach a value of US$2,178 million by 2024 as operators and providers worldwide continue to move from legacy equipment to modernized, streamlined, and automated solutions. Where mass 5G rollout is concerned, operators are leveraging cloud-native solutions to drive the massive scaling of services and applications.

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As networks become increasingly adaptable, operators adopting fully orchestrated cloud-native platforms can expect deeper market penetration and faster innovation for their operations, whilst achieving significant growth and return on investments. Kubernetes platforms, with their unified operations models and shared resource pools, are helping to realize the potential of 5G services, providing users with a more vibrant supplier ecosystem while saving costs through advanced metal to service automation.

ENABLING 5G SERVICES WITH EDGE COMPUTING
Real-time functionality and low latency communications are now an essential requirement for many modern devices and applications. Internet of Things (IoT) devices are everywhere, and businesses involved in all kinds of industries including energy, agriculture, smart cities, and logistics have all turned to these to revolutionize their existing operations. With 5G connectivity comes insurmountable expectations, requiring high bandwidth connectivity and low latency. Edge services have become vital to enable this, while enhancing the QoE (Quality of Experience) for users.

MEC (Multi-access Edge Computing) enables cloud-computing capabilities at the edge of the network, amplifying the opportunities made possible through efficient service delivery. Virtual environments are hosted close to the devices that require connectivity. Instead of backhauling all data to a central site for processing, operators can now access a service that can run locally, whilst offering increased throughput alongside minimum latency. This is empowering applications such as VR/AR (Virtual and Augmented Reality), Autonomous X, Industry 4.0, and UHD (Ultra-High-Definition) videos that require a real-time connection.

CONNECTING LIFECYCLE TASKS WITH KUBERNETES
Most operators are now migrating from VMs (Virtual Machines) to containers, with 30 percent of IT leaders expecting to significantly increase container usage in 2022. For an operator to scale just one part of an application with VMs would traditionally necessitate an entire additional VM to be instantiated, requiring the compute, network resources, store and guest operating system associated with it too.

Kubernetes allows this process to be reduced from minutes to seconds, with isolated systems able to run on a singular OS (Operating System). Applications are broken down into constituent parts and functions called micro-services. Doing this allows operators to scale out the micro-serviced container responsible for a specific function or task, greatly improving efficiency.

Kubernetes can also be set to auto-scale the microservices that can be based on several KPIs, further reducing network reaction times to content delivery requests. Similarly, Kubernetes can heal itself when there is a discrepancy between the declared optimal state and any suboptimal state. For example, malfunctioning resources or fault stages can trigger an automated response.

SELECTING A CLOUD-NATIVE PLATFORM FOR ADVANCED CONTENT DELIVERY
When it comes to the deployment and massive scale-out of 5G services, how you automate is as important as what you automate. As more professionals move their big data applications to containers empowered by Kubernetes, demand for ML (Machine Learning) applications and IoT technologies continues to grow. Variation between different platforms and orchestration solutions means there can be large disparities in time to outcome, resource utilization, solution costs, and opportunities. There is no simple cure-all for scale-out or repetitive tasks, and operators need to be aware more is required for 5G services to be a success at a scale, especially when choosing between the comparative benefits of automated

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Kubernetes platforms are helping to realize the potential of 5G services. Photo courtesy Shutterstock ●●●

cloud platforms and orchestration solutions.

The ease of use of a system is key to an operator's success throughout the lifecycle of its service. Unification of lifecycle automation, workflows and overall operations is essential, even when deployed across a wide variety of locations, including VM and container environments.

HANDLING STATEFUL WORKLOADS FOR OPTIMAL PLATFORM EFFICIENCY

One factor becoming more prevalent in Kubernetes is the ability to handle stateful workloads such as subscriber information. If handled well, the efficiency and agility of an operation can be significantly improved. However, as Kubernetes microservices can add further complexity, snapshotting and cloning storage volumes can no longer be considered enough. For zero-touch-automation, an operator would also need to snapshot the other constructs, such as application metadata, configuration, and SLA (Service Level Agreement) policies. By doing so, applications can be rollbacked to a previous state or cloned to enable a fully functioning running database from a previous snapshot, with no hunting, hardcoding, or restarting from scratch required. The storage only way of doing things goes against the agility and efficiency expected of a platform like Kubernetes and will only serve to restrict the capabilities of the overall solution.

DATA-DRIVEN SOLUTIONS FOR AN INTEROPERABLE ECOSYSTEM

Concerns over interoperability are inevitable due to the open, multi-vendor nature of Edge and MEC solutions. Operators will no doubt wish to manage potential challenges like overall service orchestration to achieve an end ecosystem that harmonizes VMs and containers, as well as unifying lifecycle automation workflows across a variety of domains up and down the hardware, software and operations stack. The result of this is the elimination of both resource and operations silos, making operations more efficient and lucrative.

Using IoT and Cloud Agnostic analytics platforms, physical information can be taken and converted into digitally processable data. Whether demographics, footfall, path movement, weather, temperature or shopping activity, any measurable data can now be collected and processed. Such information can even be used to provide insight and reports that can be harnessed to enable data driven solutions for any industry using AI (Artificial Intelligence) and ML tools.

To this end, the components must be able to support the entire service edge ecosystem by leveraging multiple services across cloud computing and contributing towards an end-to-end 5G solution. Services such as data analytics, network functions and lifecycle automation, all the way down to the infrastructure and hardware layers must be in harmony to work together.

MEETING 5G EXPECTATIONS WITH ENHANCED OPERATIONS

In 2021, 68 percent of IT professionals increased their use of Kubernetes due to the pandemic, and this trend is expected to increase over the coming years. Seeking a competitive edge Rakuten became the industry's first telecom operator to provide a 100 percent cloud-native architecture, which is being leveraged in a multi-vendor, end-to-end 5G rollout.

With now considered to be the secret weapon for unlocking cloud-native potential, these platforms will undoubtedly continue to automate development with increased flexibility and adaptability. Operators who leverage the benefits of a cloud 5G can expect to achieve a more competitive service offering, with faster innovation towards delivering high-quality connectivity in the face of immense demand.

Enabling metal to service orchestration for deployment and life cycle management of the network services at 5G scale will be a key enabler of delivery of services at the edge. Robin Telco grade Robin Cloud Native Platform (CNP), coupled with the multi-cluster orchestration capabilities of Robin Multi Data Center Automation Platform (MDCAP) can reduce time to service delivery by 80 percent, CapEx savings by 50 percent, and OpEx costs by 40 percent. ●

When it comes to the deployment and scale-out of 5G services, how you automate is equally important as what you automate. Photo courtesy Shutterstock ●●●

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